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(54) IMPROVEMENTS RELATING TO CONVECTOR SPACE HEATERS

(71) I, TONY BENJAMIN CHESTER, a British Subject, of 29 James Road, Staple Hill, Bristol BS16 4SY, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to convector space heaters.

According to the present invention there is provided a convector space heater comprising a casing, a sealed liquid heat exchanger within the casing, a blower below the heat exchanger for directing air over the heat exchanger, and an immersion heater for heating the liquid in the heat exchanger, wherein the heat exchanger is a finned structure with generally horizontal, co-planar tubular passages, the fins being in a parallel array with each fin spanning and being in contact with each tubular passage in its plane.

The heat exchanger may be oil filled and be without any external circulation. Preferably the tubular passages are in the form of a cylinder with lateral hollow extensions, each extending outwardly from the cylinder and in communication with the liquid space within the cylinder. A thermostat may be arranged to switch on the blower and operate the immersion heater when the temperature falls to a desired minimum.

The invention may be performed in various ways and some constructional forms will now be described, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is a diagrammatic perspective view of a first convector space heater:—

Figure 2 is a similar view of a second convector space heater; and

Figure 3 is a front view of a fin used in the heater of Figure 2.

The principal components of the heater of Figure 1 are housed in a box-like unit 1 which has a grill 2 near the top of its outer face, and through which the heated air emerges. The heat exchanger comprises a block 3 made up from a serpentine pipe 4 whose loops are interconnected by transverse fins 5. In combination, the pipe and fins form a grid through which air can be blown. The pipes are connected to a copper cylinder 6 fitted internally with an immersion heater 7. Also within the unit 1 is a fan 8 which directs air upwardly through the finned block 3. The immersion heater and the fan are electrically powered from a common supply point 9.

The cylinder 6 and the pipe 4 which is connected therewith form a closed circuit which is filled with cold water from, for example, a cold tank 10 normally located in a loft. The pipe 4 is provided with an air vent 11 to facilitate the filling of the circuit and a shut off cock 12 is provided in the pipe 13 from the tank, to be operated when the circuit is filled. The fan and the immersion heater are conveniently controlled by one or more thermostats (not shown).

For use, the closed circuit of the pipe 4 and cylinder 6 are filled with cold water and the immersion heater is switched on. When the water in that circuit attains a given temperature, a thermostat is caused to switch on the fan 8 and air is blown upwardly through the heat exchanger and out through the grill 2. The circuit acts as a gravity system, and the fins diffuse the heat from the pipe throughout the block 3.

The convector heater of Figure 2 also employs a blower 14 which directs air upwardly through a finned block 15. This block is formed by a cylinder 16 in which is fitted an electric immersion heater 17, the cylinder having laterally projecting U-shaped extensions 18 formed by piping in communication with the main part of the cylinder. The cylinder 16 and extensions 18 are filled with oil, a filler cap 19 being provided at one end and an air bleed plug 20 at the other. Fins 21 are arrayed along this cylinder and are shaped as best seen in Figure 3. They are rectangular with a central circular aperture 22 corresponding to the outer diameter of the cylinder and with lateral notches 23 extending from the central aperture,

corresponding to the shape of the extensions 18 viewed in the axial direction of the cylinder. Thus the fins can be mounted by being placed over one end of the cylinder and moved longitudinally thereof until the correct position is attained. In order to cope with the filler and bleed plugs some of the plates will have further notches 24, indicated by a broken line. Around the aperture 22 of each fin a flange 25 is pressed out, and this will closely embrace the outer surface of the cylinder and can be readily brazed thereto. It also provides an abutment for locating the next fin in the array on the cylinder.

The blower body 26 is an elongated barrel-like member with vanes 27 extending in the axial direction. It is rotated by a motor (not shown) and the vanes are angled so that air is drawn in through the bottom of the casing 28 and directed upwardly through divergent ducting 29 whose upper end is spanned by the finned block 15. As the air passes through this block, it is heated by the fins, the cylinder and its extensions. The heated air emerges through grille 30 at the top of the front panel of outer casing 28.

A thermostat 31 is attached to one end of the block, and this governs the operation of the blower motor and the on-off power supply to the immersion heater. The thermostat can be adjusted by a control 32 which sets the desired minimum temperature below which the heater is operative, and the speed of the blower by a knob 33. A switch 34 is provided for cutting out the power supply to the immersion heater, but enabling the motor to drive the blower so that the apparatus can work as a cool air convector. The part indicated by 35 is a terminal block to which the main power supply and other electrical wiring is connected.

It will be understood that the finned block may take various forms, and in particular the cylinder and lateral extensions may be differently shaped; for example the cylinder may be a rectangular or square section tank.

It is expected that such convector heaters, of a size compatible with domestic requirements, could achieve an output of 9000 BTUS.

In these heaters, there is only a small volume of liquid to heat, and so warm-up is rapidly achieved and the temperature is easily maintained.

WHAT I CLAIM IS:—

1. A convector space heater comprising a casing, a sealed liquid heat exchanger within the casing, a blower below the heat exchanger for directing air over the heat exchanger, and an immersion heater for heating the liquid in the heat exchanger, wherein the heat exchanger is a finned structure with generally horizontal, co-planar tubular passages, the fins being in a parallel array with each fin spanning and being in contact with each tubular passage in its plane.

2. A heater as claimed in claim 1, wherein the heat exchanger is oil filled.

3. A heater as claimed in claim 2, wherein there is no oil circulation path outside the heat exchanger.

4. A heater as claimed in claim 2 or 3, wherein the tubular passages are in the form of a cylinder with lateral hollow extensions, each extending outwardly from said cylinder and in communication with the liquid space within the cylinder.

5. A heater as claimed in any preceding claim, wherein the blower and immersion heater are thermostatically controlled.

6. A convector space heater substantially as hereinbefore described with reference to Figure 1 or Figures 2 and 3 of the accompanying drawings.

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1531 991 COMPLETE SPECIFICATION
3 SHEETS

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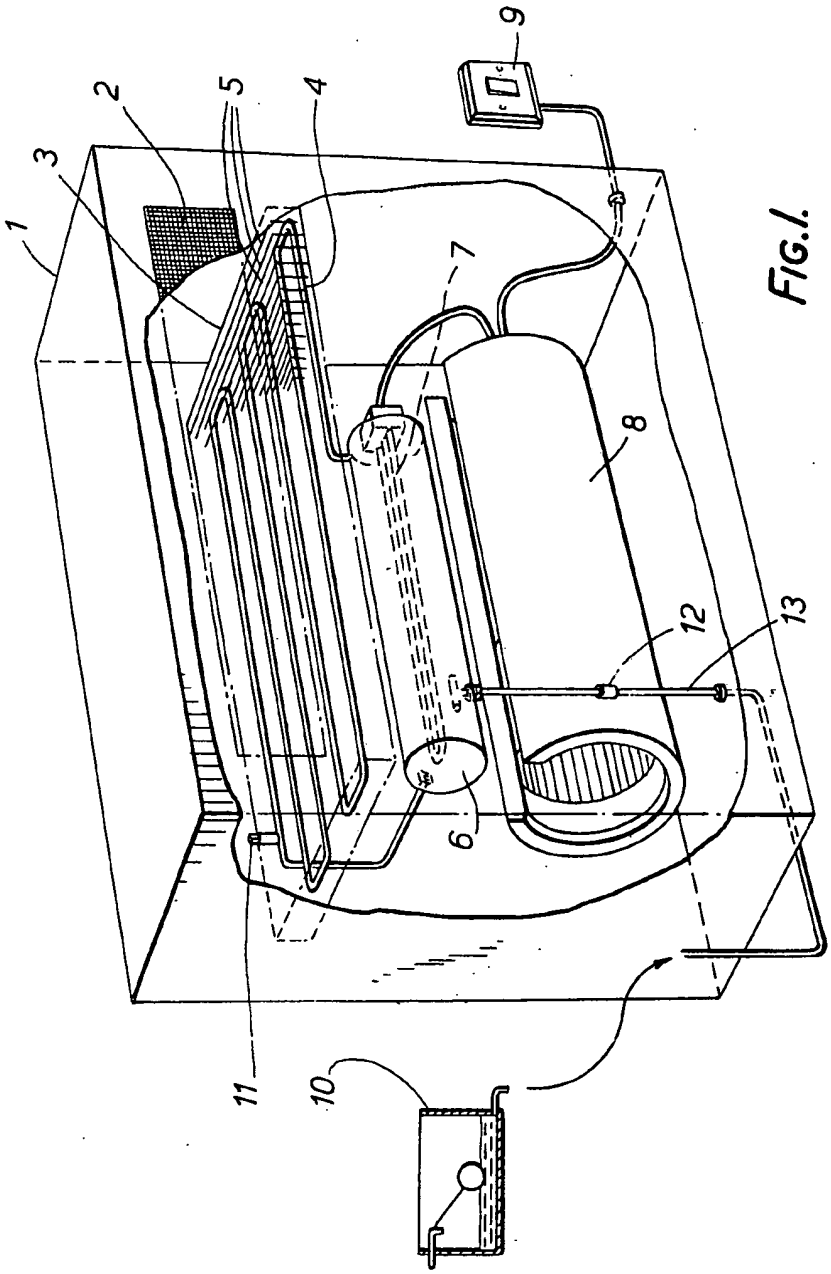

FIG. 1.

1 531 991 COMPLETE SPECIFICATION
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SHEET 2

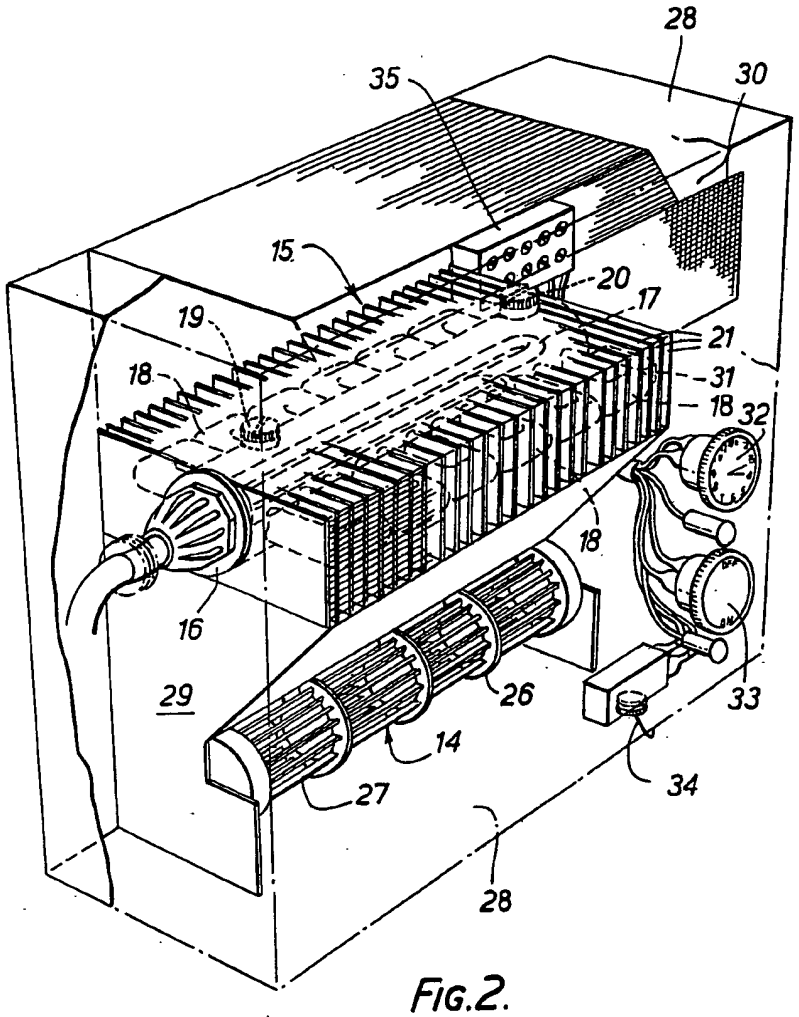

FIG.2.

1 531 991
3 SHEETS

COMPLETE SPECIFICATION

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SHEET 3

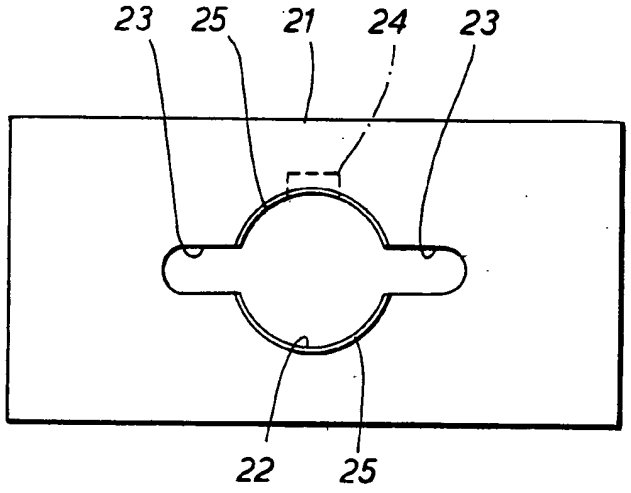

FIG. 3.